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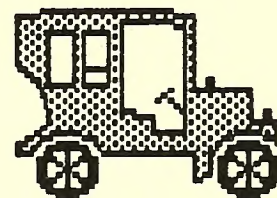
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NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

TRAFFIC ENGINEERING BRANCH

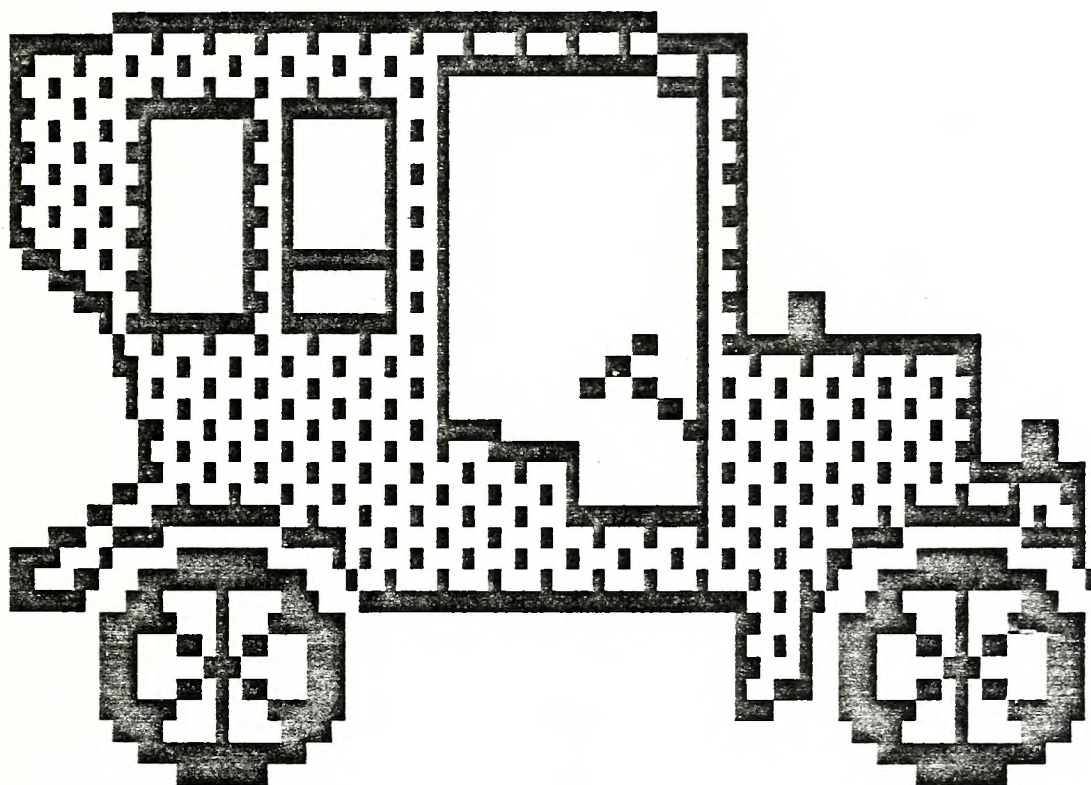
1984



ANNUAL REPORT



ANNUAL REPORT 1984



TRAFFIC ENGINEERING BRANCH

DIVISION OF HIGHWAYS

DEPARTMENT OF TRANSPORTATION

PREPARED BY: FIELD OPERATIONS SECTION

FIELD SUPPORT AND ACCIDENT STUDIES UNIT

FEBRUARY 1985

THE
FEDERAL BUREAU OF INVESTIGATION
UNITED STATES DEPARTMENT OF JUSTICE
WASHINGTON, D. C. 20535

TO : DIRECTOR, FBI (100-442100)
FROM : SAC, NEW YORK (100-100000)
SUBJECT: [Illegible]
RE: [Illegible]

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FEBRUARY 1965

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ACKNOWLEDGEMENTS

The close working relationship between the Traffic Engineering Branch and other branches in the Division of Highways makes it difficult, within the confines of this text, to acknowledge all the members of the Highway "family" who have contributed to traffic engineering efforts of 1984 and other years, but we wish to express our gratitude for their cooperation and assistance.

We would like to take this opportunity to also recognize the cooperation and support of agencies outside the Division of Highways who have helped to make the accomplishments of the Traffic Engineering Branch possible. Some of these are: The Federal Highway Administration; the Governor's Highway Safety Program; the Division of Motor Vehicles, particularly the Traffic Records Section; the Highway Patrol Division; and the UNC Highway Safety Research Center.

INTRODUCTION

The Traffic Engineering Branch's accomplishments for 1984 emphasize the diversity of work required in meeting responsibilities to the Division of Highways and to all who use State road facilities.

Work performed by the Branch in 1984 is presented according to the several units, with professional activities listed alone. Activities of the Division Traffic Services Units, whose work is closely tied with the Traffic Engineering Branch, are reported under a separate heading. Activities for the year are enumerated wherever practical. Such figures, however, often represent only the results of extensive preparation and ground work, factors not easily stated in terms of quantity.

The Annual Report, as presented within the framework of Branch organization and responsibilities, is intended to serve two purposes:

1. To furnish Division of Highway's officials and other interested persons with factual information on the annual work of the Traffic Engineering Branch.
2. To explain the functions of this Branch within the structure of the Division of Highways - to trainees, to new employees, to college students and to various groups interested in the safe and efficient control of traffic on the streets and highways of North Carolina.

ORGANIZATION AND RESPONSIBILITIES

The Traffic Engineering Branch is staffed to the Assistant State Highway Administrator of the Division of Highways.

Essentially, the Branch is responsible for the safe and efficient traffic operations on the State Highway System - a system that consists of 12,048 miles of Interstate and rural primary US and NC numbered routes; 59,611 miles of rural secondary routes; and 4,648 miles of highway system routes within municipalities, for a total of 76,307 miles.

Some of the specific duties of the Branch are as follows:

1. To develop policies for the use of pavement marking, signing, signalization, channelization, driveway and street entrances, median crossovers, speed zones, highway routing, and parking regulations on the State Highway System.
2. To prepare geometric and traffic signalization designs based upon field traffic engineering investigations, to improve the safety and capacity of problem locations on the existing highway system, and to establish optimum traffic signal timing for intersections on arterials and in networks.
3. To make continuous analyses of accident severity, types of accidents, locations within high accident frequency, and other studies leading to soundly conceived recommendations for improvements that are designed to reduce accident experience or severity, relieve congestion, and increase safety and efficiency of the State Highway System.
4. To develop and implement various traffic safety programs for the North Carolina Department of Transportation, including Federal Highway Safety Programs and Projects as they are applicable to North Carolina. Under this responsibility, the Branch develops, updates, and is implementing the Department of Transportation's North Carolina Highway Safety Program.
5. To work closely with the 14 Division Traffic Services Units - setting uniform statewide policies and standards for the traffic engineering work they perform.
6. To investigate requests, complaints, and suggestions for traffic operations improvements submitted to the Division of Highways by individuals, groups of citizens, public officials, and the Division's own personnel.

7. To prepare Traffic Control Plans for all construction projects to safely and expeditiously guide traffic through the construction zones.
8. To provide technical advice and assistance to municipal officials and local governing bodies, upon their request. To provide Traffic Engineering Services to municipalities under 50,000 population.
9. To manage funds allocated for the historical marker program on State roads in cooperation with the Department of Archives and History, which is the State agency that requests these markers and submits appropriate legends for them.

There are 86 positions in the Traffic Engineering Branch as shown on the organization chart on page 7: 44 traffic engineers, 30 engineering technicians, 1 traffic control shop supervisor, 2 electronic technicians, 1 traffic control shop technician, 1 statistical research assistant, 1 clerk typist, 2 records clerks, 1 typist III, 2 word processors, and 1 clerical supervisor.

The Traffic Engineering Branch is organized into two major functions: Field Operations and Technical Operations, each headed by an Assistant Manager of Traffic Engineering. This division of the organization is designed to provide a responsive decentralized field traffic engineering force with an efficient centralized technical policy-making and design organization based in Raleigh to support the field forces and a group of personnel functions of the Branch. These functional groupings are further subdivided as shown below:

- I. ADMINISTRATION
Administrative Unit
- II. TECHNICAL OPERATIONS
Traffic Control Unit
Signals and Geometrics Unit
Signing unit
- III. FIELD OPERATIONS
Signals Management Unit
Field Support and Accident Studies Unit
Area Traffic Engineering Units (3)
 - Wilson Office
 - Winston-Salem Office
 - Asheville Office

ADMINISTRATION

The Administrative Unit is staffed directly to the Manager of Traffic Engineering and includes a word processing clerical pool which serves the entire Branch. This unit also handles all personnel records, financial records, and equipment and supply needs.

TECHNICAL OPERATIONS

TECHNICAL OPERATIONS, headed by the Assistant Manager of Traffic Engineering (Technical Operations), provides a central design and technical policy-making function which provides final plans for construction of improvements and promotes uniform traffic engineering practices and quality control statewide. Technical Operations is subdivided into three units as follows:

The Traffic Control Unit prepares Traffic Control Plans for contract construction and maintenance projects involving construction, phasing, construction methods, and traffic control devices to safely and efficiently handle traffic in work zones.

The Signals and Geometrics Unit prepares traffic and geometric design plans for spot improvements installed by State Forces and traffic signal designs for contract installation. This unit also coordinates with the Federal Highway Administration, other Branches, cities and the railroad companies within the State in the preparation of agreements and plans for the installation of railroad-grade crossing signals.

The Signing Unit prepares sign design plans to include sign lighting for contract construction projects. This unit also reviews and processes all requisitions for signs and sign materials installed by Division Traffic Services.

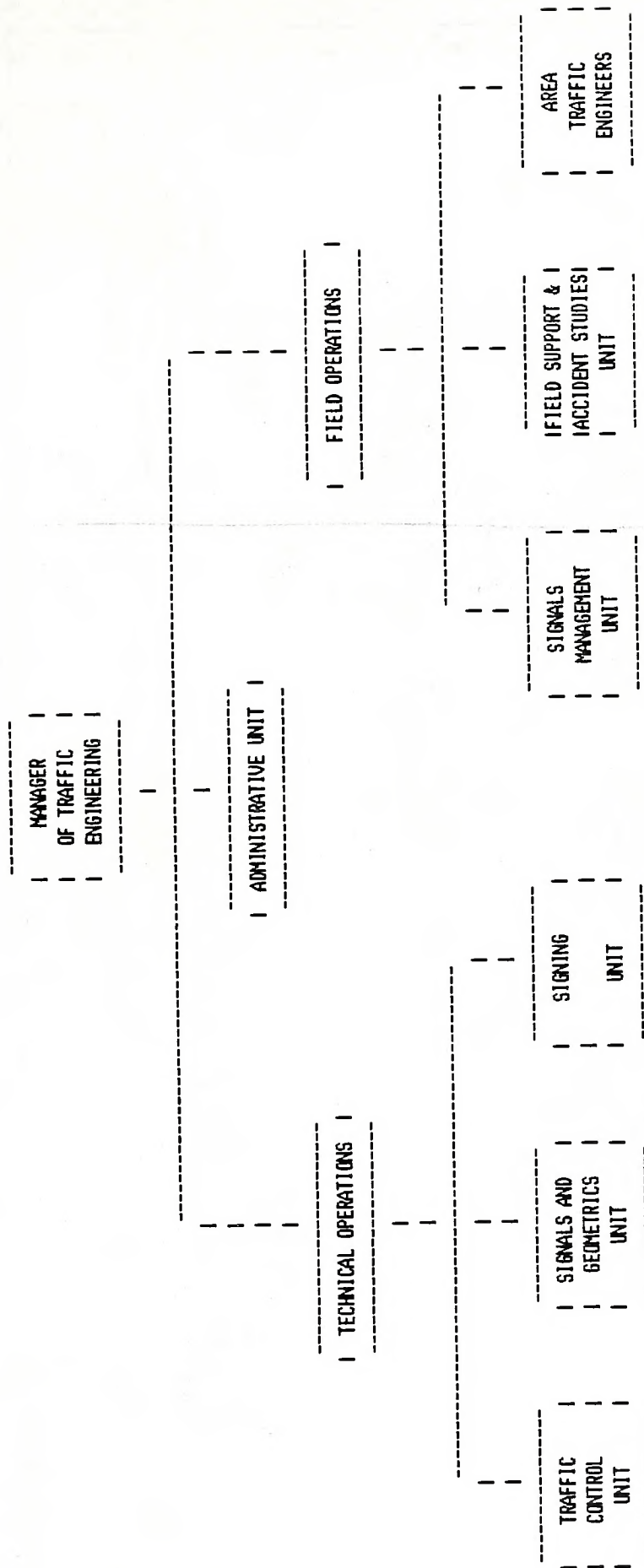
FIELD OPERATIONS

FIELD OPERATIONS, headed by the Assistant Manager of Traffic Engineering (Field Operations), consists of a Raleigh Office Signals Management Unit, Field Support and Accident Studies Unit, and three Area Traffic Engineering Units with Area offices in Wilson, Winston-Salem, and Asheville.

The Signals Management Unit optimizes the timing and operation of traffic signals and signal systems and prepares traffic signal specifications for the purpose of purchasing and installing traffic signal equipment. This unit also is involved in the inspection of traffic signal and railroad crossing signal installations.

The Field Support and Accident Studies Unit serves as a liaison between the field units and the Technical Operations Unit, other branches within the Division of Highways, various state and federal agencies and the public in general, as well as provides technical and administrative assistance to the Assistant Manager of Traffic Engineering (Field Operations). This unit administers the Municipal Traffic Engineering Assistance Program, which provides traffic engineering assistance, upon request, to those municipalities under 50,000 population that do not have a traffic engineer or traffic engineering department. In addition, this unit coordinates reviews of roadway plans produced by the Highway Design Branch in the preliminary and advanced stages of design, and reviews driveway permits for major traffic generator locations. Other duties of this unit include performing various special traffic engineering projects, conducting evaluation projects on traffic control devices, maintaining the Branch Technical Library, coordinating technical meetings and training activities, and publishing Branch technical materials, including this report.

Each Area Traffic Engineering Unit has one or more Traffic Engineers. Their prime responsibility is to investigate and recommend improvements at locations on the State Highway System which are experiencing traffic operational and safety problems. The three Area Traffic Engineers work closely with the Division Traffic Engineers located in each of the 14 operational Highway Divisions throughout the State (see map, page 8, Area Traffic Engineering Unit Area Assignments), providing advice and assistance when necessary.



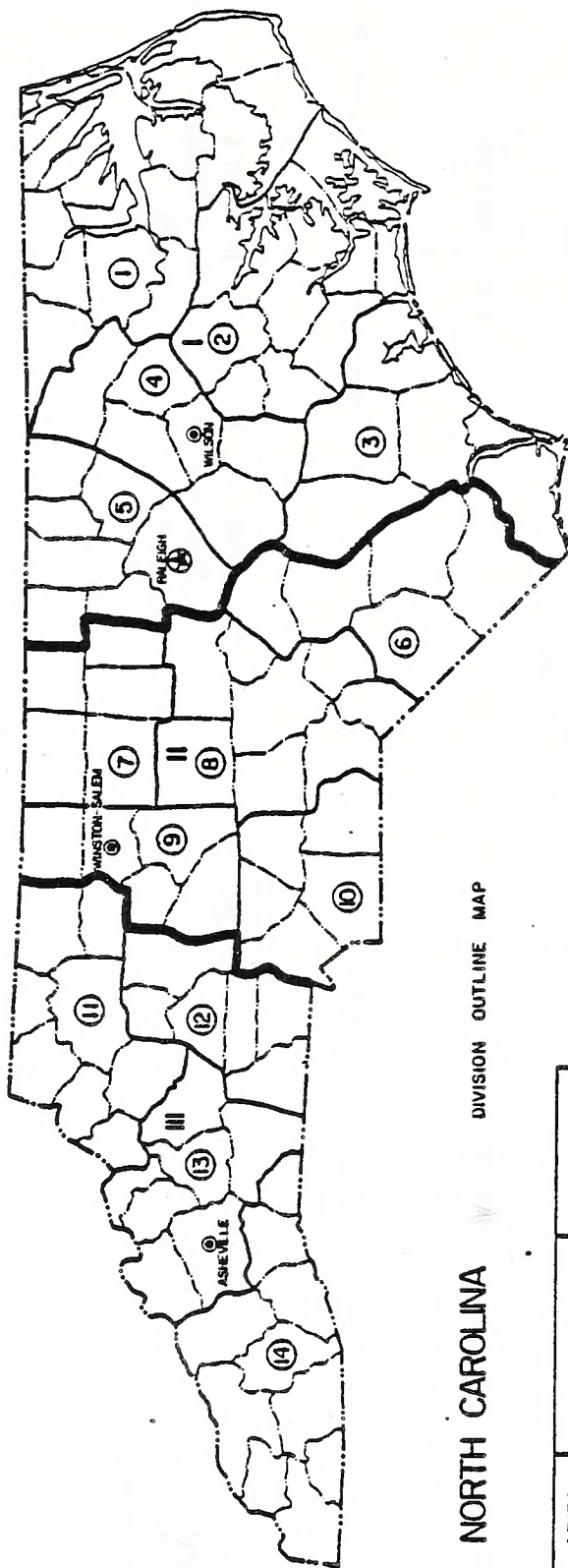
TRAFFIC ENGINEERING BRANCH OPERATIONAL CHART

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

TRAFFIC ENGINEERING BRANCH

AREA ASSIGNMENTS



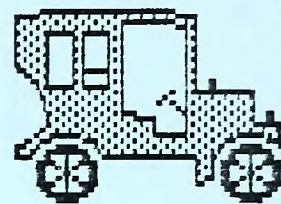
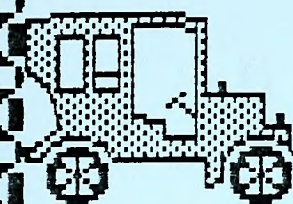
NORTH CAROLINA

DIVISION OUTLINE MAP

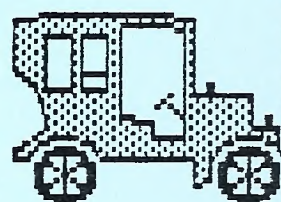
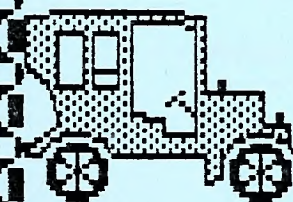
AREA	OFFICE	DIVISIONS
I	WILSON	1, 2, 3, 4, 5
II	WINSTON-SALEM	6, 7, 8, 9, 10
III	ASHEVILLE	11, 12, 13, 14

LEGEND

- COUNTY LINE
- DIVISION LINE
- AREA LINE
- AREA OFFICE



ADMINISTRATION



ADMINISTRATIVE UNIT

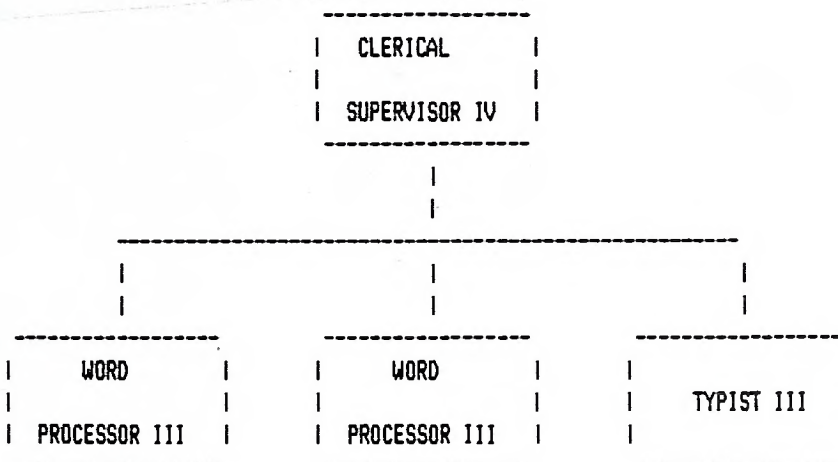
Purpose.

The Administrative Unit, in general, is responsible for all clerical and word processing work for the entire Branch, maintaining personnel records, processing all purchase requisitions, keeping financial records, and maintaining equipment and supply inventories.

Personnel.

As indicated on the organization chart for the Branch (page 7), the Manager of Traffic Engineering directs the activities of the Administrative Unit which is composed of one Clerical Supervisor IV, two Word Processor III's and one Typist III.

The Clerical Supervisor IV supervises the Unit.



ORGANIZATION CHART

ADMINISTRATIVE UNIT

Organization Changes:

None.

Activities and Accomplishments:

The Administrative Unit types many letters, memoranda and reports each day for Branch personnel. The Traffic Engineering Branch Annual Report, Annual High Accident Location Listing, and various municipal agreements are examples of such work.

Personnel files and records are maintained by this Unit. Salary increment due dates for Branch employees are monitored by the Unit, and appropriate forms to grant these increments are processed when due. Positions that have been downgraded are monitored to be sure that people working in them are promoted or receive salary adjustments when they become eligible.

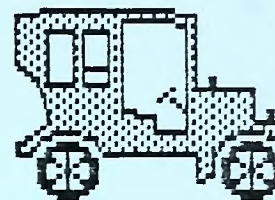
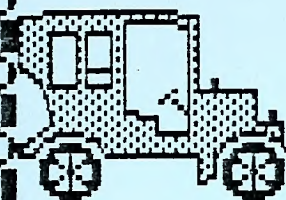
All purchase requisitions are typed by this Unit. A file of purchase requisitions and purchase orders is maintained and material received reports are sent to the Purchasing Department when materials ordered are recieved. A record of funds budgeted, funds expended, balance remaining for the fiscal year is kept.

All requests for travel and travel expense advances are processed by the Unit. Employee's moving procedures, motor pool care requests, equipment rental cards, workmen's compensation forms, entering job reports on the terminal, and time cards are among some of the routine duties performed by the Administrative Unit.

The Branch's Administrative files are maintained and office supplies are requisitioned from the Highway Building Supply Room by the Administrative Unit. Members of the Unit act as key operator for the Branch's duplicating machine, keep an inventory of supplies and equipment, and check out equipment to Branch personnel.

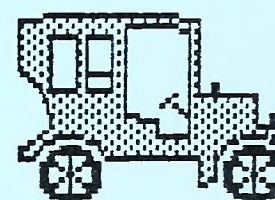
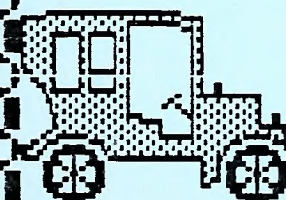
The Historical Marker Program for the state is handled by this Unit in conjunction with the Department of Archives and History.

The Administrative Unit also serves as receptionist for the Branch, answering the telephone, with all calls for the entire staff coming through the central office.



TECHNICAL

OPERATIONS





TECHNICAL OPERATIONS GROUP

Technical Operations, under the direction of the Assistant Manager of Traffic Engineering (Technical Operations), consists of the following units:

1. Traffic Control
2. Signals and Geometrics
3. Signing

All of these units are located in the Raleigh Office. They are responsible for developing final designs, specifications, standards, and engineering estimates for traffic engineering projects and traffic control devices in their respective areas of expertise on a statewide basis. A detailed description of each Technical Operations Unit and their accomplishments during 1984 follow under separate headings. Activities for each unit of Technical Operations are also enumerated for the years 1980-1984, where information is available. The activity charts show semi-annual quantities for January-June and July-December of each year, as well as annual totals, where practical.

TRAFFIC CONTROL UNIT

Purpose:

The primary functions of the Traffic Control Unit are:

1. To prepare traffic control plans for Roadway Construction Projects.
2. To review traffic control plans sent in by consultants and Roadway.
3. To design pavement marking placement.
4. To complete special projects assigned.

Personnel:

The Traffic Control Unit is staffed directly to the Assistant Manager of Traffic Engineering (Technical Operations) and consists of:

One Traffic Control Engineer	- (HE III)
One Traffic Control Project Engineer	- (HE II)
Six Traffic Control Project Design Engineers	- (HE I)
Eight Traffic Control Technician IIIs	- (ET III)

Organization Changes:

This unit experienced significant changes during 1984. The Traffic Control Unit had previously been combined with the Signing Unit. After dividing into two units during 1984, several HE IIs were lost, but four HE Is were gained as well as two ET IIIs.

 | TRAFFIC CONTROL |
 | ENGINEER |
HE III

|
 |

 | TRAFFIC CONTROL |
 | PROJECT ENGINEER |
HE II

|
 |

-----	-----	-----	-----	-----	-----	-----	-----
| TRAFFIC CONTROL |	| TRAFFIC CONTROL |	| TRAFFIC CONTROL |	| TRAFFIC CONTROL |	| TRAFFIC CONTROL |	| TRAFFIC CONTROL |	| TRAFFIC CONTROL |	| TRAFFIC CONTROL |
| DESIGN ENGINEER |	| DESIGN ENGINEER |	| DESIGN ENGINEER |	| DESIGN ENGINEER |	| DESIGN ENGINEER |	| DESIGN ENGINEER |	| DESIGN ENGINEER |	| DESIGN ENGINEER |
| HE I |	| HE I |	| HE I |	| HE I |	| HE I |	| HE I |	| HE I |	| HE I |
-----	-----	-----	-----	-----	-----	-----	-----

|

|

 | TRAFFIC CONTROL |
 | DESIGN TECH. |
ET III

 | TRAFFIC CONTROL |
 | DESIGN TECH. |
ET III

 | TRAFFIC CONTROL |
 | DESIGN TECH. |
ET III

 | TRAFFIC CONTROL |
 | DESIGN TECH. |
ET III

ORGANIZATION CHART

TRAFFIC CONTROL UNIT

 | TRAFFIC CONTROL |
 | DESIGN TECH. |
ET III

 | TRAFFIC CONTROL |
 | DESIGN TECH. |
ET III

Activities and Accomplishments:

PS & E packages were prepared for the traffic control of projects while close communications were maintained with field personnel. City officials were made aware of the specialized problems in a given area to eliminate as many conflicts after the letting as possible. Where problems did develop, project revisions were completed and sent as expeditiously as possible.

The Traffic Control Unit prepared 146 Traffic Control Projects over the past year, necessitating 25 field investigations and 88 meetings. Also, 28 Traffic Control Plans were revised because of problems developing after letting to contract.

Some of the special assignments completed over the past year were:

- ... A manpower study was prepared which emphasized the need for more trained employees.
- ... The Interstate Cost Estimate was completed.
- ... Old specifications were rewritten and new ones prepared to cover the ever-improving procedures and materials used in traffic control as well as pavement marking.
- ... A study was completed on long-life marking quality.
- ... Traffic control standards were finalized for inclusion into roadway standards.
- ... Traffic count requests were prepared for Planning and Research on high category projects.
- ... Computer programs were written for inputting data on both the mainframe computer and the Apple computer.
- ... Research was conducted on milling processes and how to do 4R rehabilitation.
- ... A comparison study of accidents occurring in highway work zones was made.

TRAFFIC CONTROL UNIT

ACTIVITY DESCRIPTION	1980		1981		1982		1983		1984	
	JAN.	JULY	JAN.	JULY	JAN.	JULY	JAN.	JULY	JAN.	JULY
	-JUNE	-DEC.	-JUNE	-DEC.	-JUNE	-DEC.	-JUNE	-DEC.	-JUNE	-DEC.
	(TOTAL)		(TOTAL)		(TOTAL)		(TOTAL)		(TOTAL)	
11. TCP Design and Final Field Inspection Meetings	|	|	|	|	|	|	|	|	|	|
	(--)		(--)		(--)		(--)		(150)	
12. Long-Life Pavement Plans	|	|	|	|	|	|	|	|	|	|
	(--)		(--)		(--)		(--)		(24)	
13. Snowplowable Pavement Plans	|	|	|	|	|	|	|	|	|	|
	(--)		(--)		(--)		(--)		(23)	
14. Preconstruction & Construction Conferences Attended	|	|	|	|	|	|	|	|	|	|
	(29)		(50)		(48)		(35)		(15)	
15. Highway Construction Plans Reviewed	|	|	|	|	|	|	|	|	|	|
	(90)		(31)		(25)		(26)		(70)	
16. Preparation of Traffic Control Plans for Construction Zones	|	|	|	|	|	|	|	|	|	|
	(105)		(77)		(138)		(143)		(146)	
17. TCP Field Investigations	|	|	|	|	|	|	|	|	|	|
	(35)		(67)		(78)		(48)		(125)	
18. Construction Revisions	|	|	|	|	|	|	|	|	|	|
	(--)		(21)		(36)		(51)		(28)	
19. Pre-Bid Conferences	|	|	|	|	|	|	|	|	|	|
	(--)		(6)		(3)		(2)		(2)	
	()		()		()		()		()	
	()		()		()		()		()	
	()		()		()		()		()	
	()		()		()		()		()	
	()		()		()		()		()	

SIGNALS AND GEOMETRICS UNIT

Purpose:

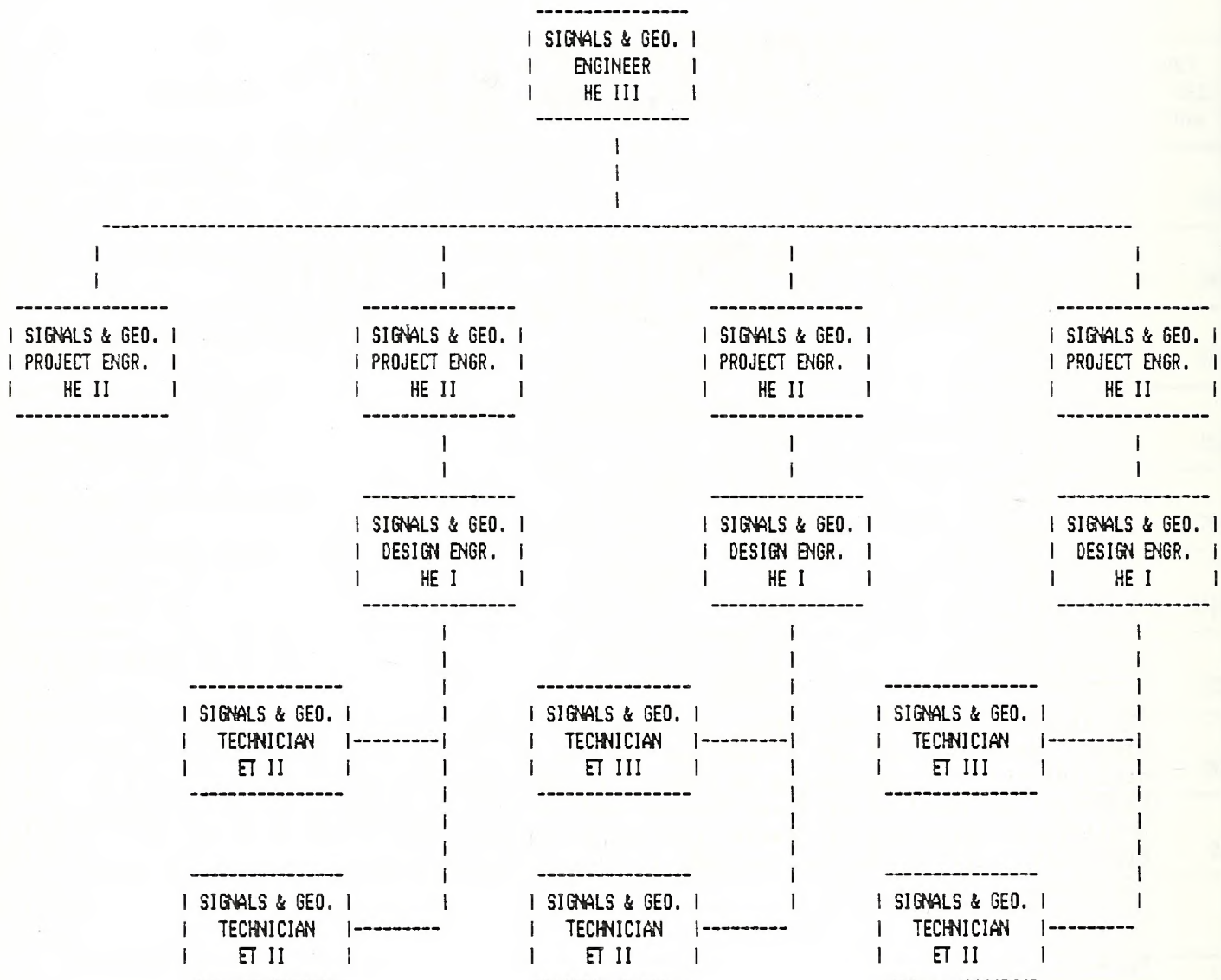
The Signals and Geometrics Unit is responsible for: (a) the preparation of plans, estimates, and specifications for the installation of traffic signals, (b) the preparation of plans for the modification of existing highway intersections by state forces, and (c) the preparation of preliminary plans and estimates, the review of final plans and the preparation agreements for the installation of railroad grade crossing signals.

Personnel:

As of December 31, 1984 the Signals and Geometrics Unit had a personnel complement of ten persons (six highway engineers and four engineering technicians). They are divided into three squads: two Signals and Geometrics Design Squads and one Railway-Highway Grade Crossing Signals Squad.

Organization Changes:

None.



ORGANIZATION CHART

SIGNALS AND GEOMETRICS UNIT

SIGNALS AND GEOMETRICS DESIGN SQUADS

Activities and Accomplishments:

The Signals and Geometrics Design Squads are principally involved in the preparation of traffic signal plans, and, to a lesser degree, intersection geometric designs. The preparation of these designs sometimes requires stadia surveys, which are usually done by the Squads. In other cases, the Squads must coordinate with the DOH Locations Unit to have the necessary surveys made. The preparation for the final designs requires consultation with others such as our Area Traffic Engineers, the Right-of-way Branch, the Utilities Section, the Roadway Design Unit, the Division personnel, the Construction Branch, and in many cases, municipal government officials.

After plans have been completed, the Squads prepare scratch requisitions for the necessary equipment. This is done in conjunction with the Signals Management Unit.

RAILWAY-HIGHWAY GRADE CROSSING SIGNALS SQUAD

Activities and Accomplishments:

This squad is responsible for advancing all railway-highway grade crossing signal projects from a project selection through its authorization for construction. Squad responsibilities include: providing data and recommendations to those responsible for selecting projects; designing the proposed layout of grade crossing signals; arranging for project funding; coordinating the detail design with the railroad companies involved; preparing the necessary municipal and railroad company agreements; preparing contract specifications; and reviewing and approving final plans, as well as estimates and materials lists.

In 1984 the Squad advanced 39 projects through their authorization for construction. This total included 36 Federal-Aid Safety Program Railroad Grade Crossing projects, the railroad grade crossing signalization portions of one Urban Program Projects and two Rural Program Projects.

SIGNALS AND GEOMETRICS UNIT

ACTIVITY DESCRIPTION	1980		1981		1982		1983		1984	
	JAN.	JULY	JAN.	JULY	JAN.	JULY	JAN.	JULY	JAN.	JULY
	-JUNE	-DEC.	-JUNE	-DEC.	-JUNE	-DEC.	-JUNE	-DEC.	-JUNE	-DEC.
	(TOTAL)		(TOTAL)		(TOTAL)		(TOTAL)		(TOTAL)	
1. Signal (only) Designs	105	139								
	(	244)	(	230)	(	227)	(	296)	(	313)
12. Geometrics (only) Designs	35	29								
	(	64)	(	74)	(	62)	(	65)	(	78)
13. Geometrics and Signal Designs	16	15								
	(	31)	(	27)	(	12)	(	17)	(	23)
14. Stadia Surveys	47	43								
	(	90)	(	59)	(	52)	(	44)	(	55)
15. Consultant Plans and Specifications Reviewed										
	(	3)	(	0)	(	0)	(	0)	(	0)
16. Review of Purchase and Scratch Requisitions										
	(	656)	(	574)	(	454)	(--)	(--)
17. Urban Programs Reports Reviewed										
	(	8)	(	5)	(	0)	(	0)	(	0)
18. Preconstruction & Construction Conferences Attended										
	(	29)	(	20)	(	5)	(	0)	(	0)
19. Contract Final Inspections										
	(	1)	(	1)	(	0)	(	0)	(	0)
	()	()	()	()	()
	()	()	()	()	()
	()	()	()	()	()
	()	()	()	()	()
	()	()	()	()	()

SIGNING UNIT

Purpose

The primary functions for the Signing Unit are:

1. To design and develop plans for signing and sign lighting.
2. To develop standard sign designs and maintain records on standard signs used by the Division of Highways.
3. To develop and maintain signing standards for the use and placement of highway signs on the public roads and streets of North Carolina.

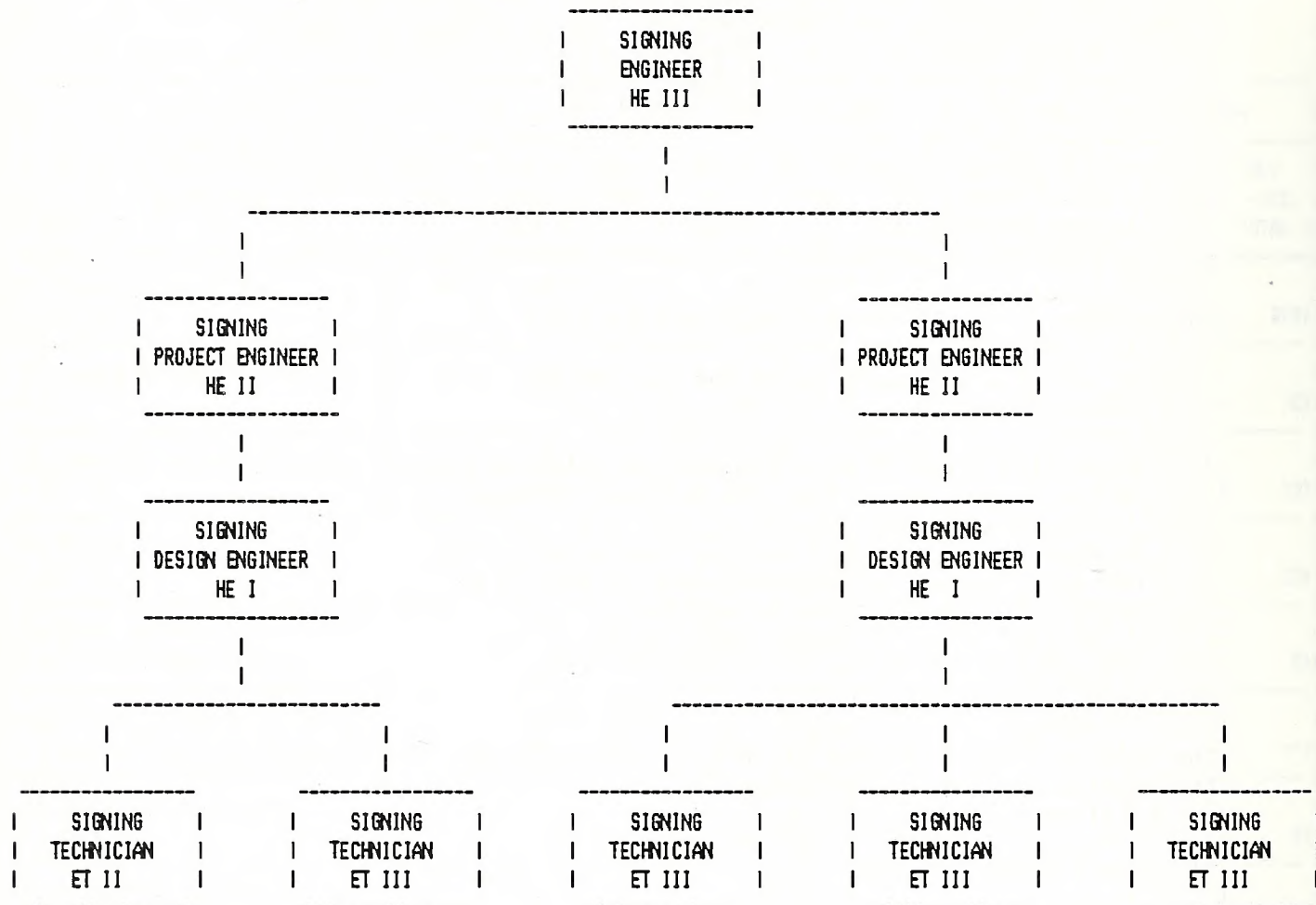
Personnel

The Signing Unit is staffed directly to the Assistant Manager of Traffic Engineering (Technical Operations) and consists of:

One Signing Engineer	-(HE III)
Two Signing Project Engineers	-(HE II)
Two Signing Project Design Engineers	-(HE I)
Four Signing Technician III's	-(ET III)
One Signing Technician II's	-(ET II)

Organization Changes

During the year the Signing Unit was separated from the Signing and Traffic Control Unit which had existed as a merged unit for approximately one year. The Signing Unit was reorganized and began functioning as a separate unit in April, 1984. At the same time several changes also occurred in personnel when several transfers of personnel occurred within the Branch. One ET III retired and one ET II resigned during the year. One Signing Project Design Engineer was also hired during the year. At the end of the year two engineering technician positions were still vacant, but all other positions were filled. The two vacant positions will be filled early in 1985.



ORGANIZATION CHART

SIGNING UNIT

Activities and Accomplishments

Over the past year, the Signing Unit has been involved in many different aspects of signing; from the more standardized procedures of project work to new and innovative ideas such as sign design by computer. Many of these new undertakings have involved large amounts of man-hours during the year in order to achieve the success that the Unit is now enjoying in improved design procedures.

Work was begun in 1984 on the expansion of the Specific Services (LOGO) signing on the Interstate System and the plans were completed for the first project on I-85. Logo signing was completed on I-95 in 1983. The remainder of the Interstate System will be signed over the next 9+ years.

PS & E packages were prepared for signing projects while close communications were maintained with field personnel. The Signing Unit prepared 20 signing projects over the past year.

Some of the major tasks completed during the past year are as follow:

- ... Developed a microcomputer program that will space lettering for signs.
- ... Developed microcomputer applications to determine sign support sizes, material quantities, costs, and perform safety check of supports.
- ... Developed computerized data bases for current signing projects and for signing plans on file.
- ... The Signing Supplement to the Manual of Traffic Control Devices was revised for reprinting.
- ... Completed 15 Signing Typical Drawings for inclusion in the Roadway Design Book of Standard Drawings.
- ... Developed methods of utilizing computer assisted drawings in preparation of signing plan sheets.
- ... Prepared the signing cost estimates for the Interstate Cost Estimate.
- ... Assisted in the development of specifications for encapsulated lens reflective sheeting.
- ... Prepared special PS&E package for contract signing at a welcome center in Division 1.
- ... Prepared answers to four employee suggestions.

SIGNING UNIT ACTIVITIES

ACTIVITY DESCRIPTION	1980		1981		1982		1983		1984	
	JAN	JULY	JAN	JULY	JAN	JULY	JAN	JULY	JAN	JULY
	-JUN	-DEC	-JUN	-DEC	-JUN	-DEC	-JUN	-DEC	-JUN	-DEC
	(TOTAL)		(TOTAL)		(TOTAL)		(TOTAL)		(TOTAL)	
1. Requisitions Processed	(	| 534 )	(	| 545 )	(	| 567 )	(	| 513 )	(	| 441)
2. Nunber Signs Designed for Requisition & Oth.	(	| 628 )	(	| 559 )	(	| 632 )	(	| 403 )	(	| 628)
3. Number Supports Design for Requisition & Oth.	(	| 14 )	(	| 63 )	(	| 90 )	(	| 33 )	(	| 57)
4. Full-Scale Drawings Completed	(	| 25 )	(	| 35 )	(	| 32 )	(	| 41 )	(	| 23)
5. Full-Scale Drawings Revised or Redrawn	(	| 15 )	(	| 1 )	(	| 6 )	(	| 7 )	(	| 11)
6. Miscellaneous Cost Estimates	(	| 10 )	(	| 17 )	(	| 43 )	(	| 23 )	(	| 19)
7. "Sign Attachments to Bridge" Investigations	(	| 6 )	(	| 9 )	(	| 6 )	(	| 5 )	(	| 13)
8. Contract Sign Projects Completed	(	| 15 )	(	| 20 )	(	| 19 )	(	| 18 )	(	| 20)
9. Contract Sign Projects Incomplete	(	| 10 )	(	| 9 )	(	| 5 )	(	| 6 )	(	| 12)
10.Signs Sized and Layout Made for Projects	(	| 344 )	(	| 744 )	(	| 637 )	(	| NA )	(	| 789)
11.Number Steel Supports Designed for Projects	(	| 380 )	(	| 498 )	(	| 824 )	(	| 347 )	(	| 555)
12.Number of Overhead Supports Designed	(	| 35 )	(	| 27 )	(	| 27 )	(	| 18 )	(	| 43)
13.Number of Overhead Lighting Sys. Design	(	| 53 )	(	| 24 )	(	| 24 )	(	| 18 )	(	| 39)
14.Projects for Which Catalog Cuts Approved	(	| 15 )	(	| 10 )	(	| 8 )	(	| 7 )	(	| 7)
15.Catalog Cut Approvals for Sign Lighting	(	| -- )	(	| -- )	(	| -- )	(	| -- )	(	| 16)
16.Contract Cost Estimates Made	(	| -- )	(	| -- )	(	| -- )	(	| -- )	(	| 50)
17.Contract Requisitions Prepared	(	| -- )	(	| -- )	(	| -- )	(	| -- )	(	| 21)



FIELD

OPERATIONS

FIELD OPERATIONS GROUP

Field Operations is under the direction of the Assistant Manager of Traffic Engineering (Field Operations). It consists of the following units:

1. Signals Management
2. Field Support and Accidents Studies
3. Area Traffic Engineering (3)

The function of Field Operations is to provide field traffic engineering services throughout the state. In accomplishing the duties of Field Operations, the staff is in frequent contact with public officials, citizens, and Division personnel. As a result, they are in an excellent position to promote good public relations and an understanding of Division of Highways' objectives on the local level.

Activities of the Signals Management Unit and the Field Support and Accident Studies Unit are enumerated for the years 1980-1984. Activities of each Area Traffic Engineering Unit are enumerated for the year 1984. The activity charts show semi-annual quantities for January-June and July-December of each year, as well as annual totals.

SIGNALS MANAGEMENT UNIT

PURPOSE:

The Signals Management Unit is charged with the responsibility for the acquisition, application, installation methods, maintenance and optimization of traffic signal equipment installed on the highway system. The unit develops specifications with appropriate installation details, provides technical support to other Branches, Units and the Highway Divisions as well as pursuing an ongoing program of optimization of signals on the highway system. The Unit is also responsible for the administration of railroad grade-crossing projects from the beginning of active construction through final acceptance and all maintenance inspections required to certify the level of maintenance performed by the railroads.

PERSONNEL:

The Signals Management Unit was formed in November of 1982 and after two years of operation is currently up to its full personnel complement. This Unit is staffed directly to the Assistant Manager of Traffic Engineering (Field Operations) and its personnel complement is as follows:

One Signals Management Engineer	-(HE III)
One Signal Systems Engineer	-(HE II)
One Signal Equipment Engineer	-(HE II)
One Assistant Signal Equipment Engineer	-(HE I)
One Signal Equipment Technician	-(ET III)
One Railway-Highway Grade Crossing Signal Technician	-(ET III)
Two Signal Systems Technicians	-(ET III)
One Traffic Control Shop Supervisor	-(TCSS)
One Traffic Control Shop Technician	-(TCST)
Two Electronic Technicians	-(ELT I)

The Unit is divided into two functional groups: a Signal Systems Squad and a Signal Equipment Squad.

ORGANIZATION CHANGES:

None.

SIGNAL SYSTEMS SQUAD

Activities and Accomplishments:

The Signal Systems Squad is responsible for the optimization of both signals and signal systems on the Highway System with a primary emphasis of helping motorists reduce fuel consumption, traffic congestion, and unnecessary delays. Many of the 3000 existing signal installations are currently operating with the timings which were implemented 10 to 15 years ago based on the traffic volumes and intersection conditions existing at that time. The Signals Systems Squad obtains recent traffic volumes, and inventories today's intersections characteristics and speeds. The new condition data is then analyzed using computer programs, primarily TRANSYT-7F, and new timings are determined for the signals based on today's conditions. An additional inventory is made of existing on-street hardware as to its operability, state of repair and need for expansion. Armed with both the new timing plans and equipment inventory, final implementation is accomplished in concert with the Highway Divisions. Optimization is one of the most cost effective measures to reduce the number of stops, the hours of delay and gallons of fuel consumed by the motoring public.

Additional studies are also conducted to determine if the interconnection of existing isolated signals will reduce vehicle operating costs. The controlling factor in such studies is normally the cost of interconnection when compared to the reduction in vehicle operating costs (benefit/cost).

Forty (40) signal retiming projects were active in 1984 of which ten (10) projects were completed. Nineteen (19) of these forty (40) were initiated in 1984. Estimates of the reductions in stops, delays and of completed projects indicates an annual average operating cost savings of \$73,000 per project. The construction costs per project ranged from \$500 to \$37,000 with the majority costing less than \$1,500. Studies completed during 1984 are as follows:

- | | |
|-------------------|------------------------------------|
| 1. Asheville | US 25A & NC 81 (Hendersonville Rd) |
| 2. Concord | US 29-601 Bypass |
| 3. Fayetteville | US 401 Bus (Ramsey St.) |
| 4. Lenoir | CBD System |
| 5. Goldsboro | Berkley Blvd. System |
| 6. Lexington | CBD System |
| 7. Morganton | NC 18 System |
| 8. Raleigh | US 64E (New Bern Ave.) |
| 9. Roanoke Rapids | Roanoke Ave. |
| 10. Burlington | CBD System |

Twenty-eight (28) grade crossing construction projects were underway at the end of 1984. Twenty-three (23) were completed during 1984 with a total billing cost of \$1,064,000. Inspections were performed on all 23 completed projects to ascertain if the construction met the requirements of the plans and specifications. Construction stake-outs prior to construction were performed at fourteen (14) construction sites at the request of the contractor.

Thirty-two (32) maintenance inspections were performed statewide by the squad to ascertain that the railroads were maintaining the protective devices adequately. The squad processed \$428,160 in maintenance payments to the railroads for maintenance of the crossings.

The Systems squad provided manpower assistance to other Traffic Engineering Branch personnel in the training and supervision of personnel in the use of various techniques and computer programs used to analyze signal system timings. Projects involving approximately fifty (50) intersections were involved in the training process. The Squad also conducted a program presentation for the North Carolina Division, Southern Section Institute of Transportation Engineers on the TRANSYT-7F computer program. Articles were also prepared for publication in professional journals.

Signal Systems personnel were also involved in the experimental testing of the latest electronic equipment for field data collection and reduction and the testing of solid state time based coordination units to provide progressive timing of traffic signals without hard wire interconnection. Experiments were conducted between the use of the TRANSYT-7F program and actual field operation results to refine the use of the TRANSYT-7F program for near saturated traffic flow conditions.

SIGNAL EQUIPMENT SQUAD

Activities and Accomplishments:

The primary responsibility of the Signal Equipment Squad is the procurement, evaluation, stocking and distribution of traffic control equipment; providing technical assistance to the Signals and Geometrics Unit in design of traffic signal layouts and equipment used; providing technical assistance to the Divisions in the installation and maintenance of traffic control equipment; and providing educational experiences for those involved with traffic signal work.

The Squad also prepares bid contracts for new equipment every two years. The Squad performs an evaluation of all equipment proposed to be furnished by vendors. Recommendations are made monthly to the Equipment Unit on the quantities and types of equipment to be ordered and stocked.

Additionally, the Squad makes technical reviews of all traffic signal equipment selected by the Signals and Geometrics Unit to assure that the equipment proposed can accommodate the developed design. Assistance is provided to the design personnel on any special equipment needed for the proper functioning of proposed traffic signals. When a special traffic signal function is required, the Squad designs necessary circuitry and develops schematics to assist the Division Traffic Control Technicians in implementing the special function.

During the past year the Signal Equipment Squad was involved in the administration of four major projects. One of these projects was completed in 1984 and the other three are in various stages of completion.

The Squad supervised the Winston-Salem Computerized Signal System Cable Project. The replacement of leased telephone lines by user owned communication lines was completed by City forces in the City of Winston-Salem. An annual cost of \$97,000 was being charged by Southern Bell for the use of leased lines. With this cost savings, plus an operational deposit refund by Southern Bell, the project will be amortized in two years.

The Squad has administered a similar project in the City of Raleigh. An on-street review of necessary utility adjustments was completed. The Squad is in the process of revising the plans and specifications and preparing the final bid documents. Negotiations are underway with the Utility companies to secure adequate space on utility poles. With an annual leasing cost of \$120,000, the replacement of leased telephone lines by user owned communication lines will be amortized in two years also.

In addition to the cable replacement projects, the Squad continued to assist the Construction Unit in the administration of the Durham Computerized Signal System. It is expected that operational testing of the system will be performed in mid 1985.

Bids were reviewed and the contract awarded for the Variable Message Matrix Sign System for the Cape Fear Memorial Bridge. This is a processor-based, selectable single-message sign system to help ensure the safety of the motorist while crossing the bridge. The installation of the sign units by the Bridge Maintenance Unit is expected in April 1985.

In addition to the major projects stated above, the Squad worked on many special projects. These projects are also in various stages of completion. Some of these are listed below:

- ... Assisted in the development of Plans, Specifications, and Estimates for a computerized signal system for the cities of Asheville, Fayetteville and Winston Salem.
- ... Assisted the towns of Chapel Hill and Carrboro in the development of a feasibility study for their traffic signal needs through the year 2000.

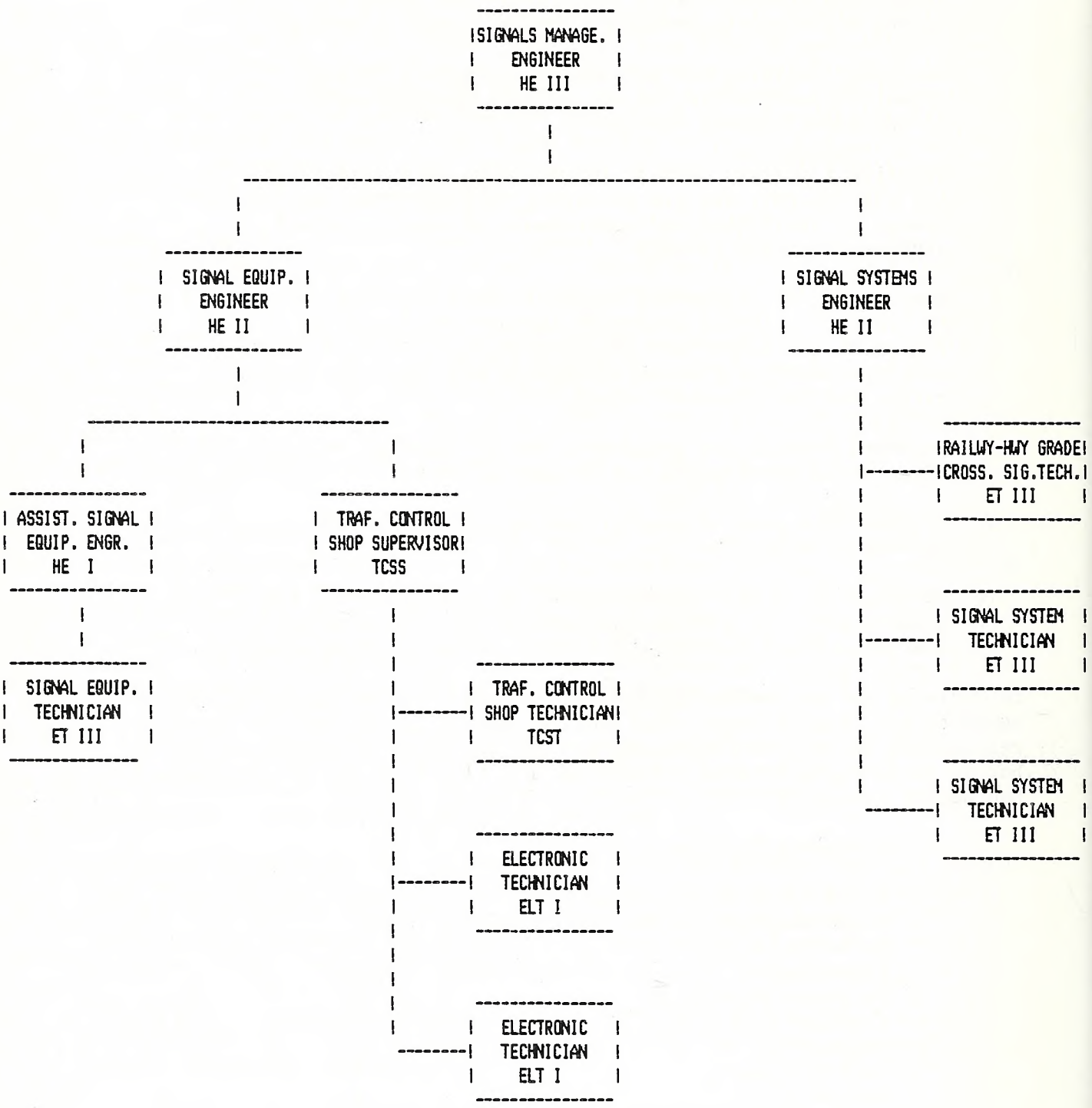
- .. Supervised the rate study associated with Schedule "C" of the Municipal Agreement for Traffic Control Devices.
- ... Developed policies and procedures to begin a Traffic Signal Inspection Program for all new installations on the State Highway System.
- ... Prepared a one-day seminar for visiting officials from the Georgia DOT, who are preparing to enter into full-scale design, installation and maintenance of traffic signal equipment similar to ours.
- ... Developed and implemented a computerized tracking system to track the flow of equipment through the Squad 's repair facilitie and set up a computerized card inventory that provides information concerning any aspect of Signal maintenance by Division Forces.
- ... Prepared designs and schematics for 15 "special functions" required by the Signals and Geometrics Unit.
- ... Reviewed 264 scratch requisitions and processed 276 purchase requisitions.
- ... In conjunction with Carolina Power & Light Company, the Squad instituted a power consumption study to determine the power usage for typical traffic signal configurations.

In carrying out the normal daily responsibility of the Signal Equipment Squad at its Central Repair Facility, in excess of \$16,000 was spent on replacement parts. An additional \$10,000 was spent on test equipment to better perform the repairs. The following is a list of accomplishments of the Repair Facility:

Equipment Repaired

Solid State Controllers/Assoc.	332
Electromechanical Controllers/Assoc.	1,255
Power Supplies	3
Loadswitches	144
Detector Amplifiers	970
Conflict Monitors	34
Preemptors	2
Test Equipment	8
Relays	3
Time Clocks	1

Total = 2,752



ORGANIZATION CHART

SIGNALS MANAGEMENT UNIT

FIELD SUPPORT AND ACCIDENT STUDIES UNIT

Purpose:

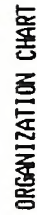
The Field Support and Accidents Studies Unit provides administrative staff to the Assistant Manager of Traffic Engineering (Field Operations) and field support including assisting field operations personnel by: setting up and maintaining central files of various types of traffic related requests from various sources; processing their requests for information and materials; processing and maintaining records of traffic ordinances and channelization fund work orders; providing service on miscellaneous requests; and tracking requests.

Other major responsibilities of this Unit include the following: conduct testing and evaluation of traffic control and traffic safety devices, materials and new traffic engineering methods for possible use on the State Highway System; conduct special traffic engineering projects and programs assigned by the Assistant Manager of Traffic Engineering (Field Operations); review street and highway construction plans prepared by the Roadway Design Unit for traffic safety and operations problems; and review Special Commercial Driveway Entrance Permit Applications.

This Unit also administers the Municipal Traffic Engineering Assistance Program which provides traffic engineering assistance to those municipalities (under 50,000 population) that do not have a traffic engineer or traffic engineering department.

In addition, this unit is responsible for performing accident studies to identify hazardous locations in North Carolina and select those locations which have the greatest potential for accident reductions. Through these studies, highway safety improvement needs can be determined, as well as the effectiveness of installed treatments.

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FIELD SUPPORT AND ACCIDENT STUDIES

Personnel:

The Field Support and Accident Studies Unit is supervised by the Field Support and Accident Studies Engineer, a Highway Engineer III. He is responsible for providing for the following major unit functions: Field Support, Special Projects, Design Review, Municipal Traffic Engineering Assistance, and Accident Studies.

The Field Support Function is handled by a Field Support Engineer who provides staff assistance to the Assistant Manager of Traffic Engineering (Field Operations) and supervises the activities of the Field Support function, including a Records Clerk and a Traffic Ordinances Clerk. The Records Clerk prepares work order requests against the Channelization Fund, maintains updated records on the Channelization Fund status, and maintains records of files set up for traffic engineering related matters investigated, studied, or reviewed by Field Operations. The Traffic Ordinances Clerk prepares highway traffic ordinances for enactment by the Department and maintains the official records of all highway traffic ordinances.

The Special Projects Function is accomplished with the assistance of an Engineering Technician III. In addition, this technician provides technical services to the unit engineers as needed and as assigned by the Unit Head with shifts in the workload.

The Design Review Function is provided by a Highway Engineer I and an Engineering Technician I.

The Municipal Traffic Engineering Assistance Function is accomplished by two Highway Engineer IIs and two Engineering Technician IIs.

The Accident Studies Function is handled by an Accident Studies Engineer, three Engineering Technician IIs, one Statistical Research Technician II and one Clerk Typist.

Organization Changes:

During the Fall of 1984, an additional Engineering Technician II was added to the Field Support and Accident Studies Unit funded under the Municipal Traffic Engineering Assistance Program to provide assistance to the two engineers working on that program.

Also, the Accident Studies Function was added to this unit.

FIELD SUPPORT

Activities and Accomplishments:

During 1984, the Field Support Function fulfilled the following responsibilities:

- ... Provided staff assistance to the Assistant Manager of Traffic Engineering (Field Operations).
- ... Developed traffic engineering operational and safety programs.
- ... Coordinated daily traffic engineering field investigative functions with central office design, data collection and analysis, and policy making functions.
- ... Processed and maintained status of Channelization Fund projects and Work Orders.
- ... Maintained project files and correspondence files and provided status reports.
- ... Handled the processing of approval by the Board of Transportation of all Traffic Ordinances on the State Highway System.

SPECIAL PROJECTS

Activities and Accomplishments:

The Special Projects Function includes a variety of engineering studies, investigations, and reports. Normally, these projects fall into one of the following categories: Traffic Control Devices Evaluation, Pavement Marking Projects, and Administrative Staff Engineering Services.

During 1984, the following Special Projects were conducted:

- ... Conducted evaluations on various traffic control devices.
- ... Planned and administered the statewide Section 205 Pavement Marking Demonstration Programs under the Highway Safety Program. Provided technical advice to field traffic engineers and Division Engineers' staff.
- ... Implemented the Recessed Pavement Marking Program in three Divisions, in which approximately 13,000 recessed reflective markers were installed by the end of the year.

- ... Published the Traffic Engineering Branch Annual Report, coordinated the Annual Traffic Services Meeting, and provided other administrative staff engineering services to the Branch Management.
- ... Handled the purchase of the microcomputer systems, which included the purchase of seven additional systems. Provided technical assistance and training to Branch employees and handled system support and maintenance.
- ... Implemented usage of applications programs including: VISICALC, APPLEWRITER IIe, PFS: FILE, PFS: REPORT, PFS: GRAPH and McTRANS Transportation Series.

DESIGN REVIEW

Activities and Accomplishments:

The Design Review Function consists of the review of shopping center driveway plans for elements of safety, capacity, and overall traffic operations.

The efficiency and safety of a street or highway depends largely upon the amount and character of any interference with vehicles moving along the roadway. The major interference encountered is that of vehicles leaving, or crossing the road or standing nearby. In order to protect the traveling public and to fully utilize the potential of the highway investment, it is necessary to regulate the vehicle movements into and out of roadside developments, thus aiding in minimizing the interference with the traffic stream. Driveway traffic accounts for a large percentage of the interruptions to smooth traffic flow. In light of the above, the Design Review Function is concerned with the special review of driveway connections onto the State Highway System. They review design elements of location, spacing, sight distance, throat width, radii, angles deceleration lanes, and grades. These elements greatly influence the operating characteristics and level of service on adjacent highway facilities.

The Design Review Function is coordinated with the Roadway Design Unit, Planning and Research Branch, Area Traffic Engineers and FHWA when special problems arise during the design stages of special commercial permits.

A summary of major accomplishments by the Design Review Squad during 1984 is as follows:

- ... 161 Special Commercial Driveway Permits were reviewed with the Highway Design Branch, Planning and Research Branch and the Area and Division Traffic Engineers. The recommendations of these branches were combined and submitted to the Division Engineer.
- ... 25 driveway permits were reviewed as Regular Commercials for compliance with the "Manual On Driveway Entrance Regulations".
- ... 178 roadway project plans were reviewed in conjunction with the Area Traffic Engineers and recommendations forwarded to the Roadway Design Branch.
- ... 15 encroachment requests were reviewed with comments and recommendations forwarded to the Design Services Unit of the Roadway Design Branch.

MUNICIPAL TRAFFIC ENGINEERING ASSISTANCE

Activities and Accomplishments:

In 1984 the Municipal Traffic Engineering Assistance Program completed 24 projects in 15 different cities and towns in North Carolina. Towns provided assistance were: Edenton, Kitty Hawk, Plymouth, Clinton, Roanoke Rapids, Henderson, Wake Forest, Dunn, Burlington, Hillsborough, East Spencer, Lexington, Hudson, Statesville and Hendersonville.

These projects ranged from comprehensive townwide traffic engineering studies involving all phases of Traffic Engineering applications to individual studies for specific or routine problems. Requests this year involved speed zones, parking studies, traffic flow studies, one-way pair studies, traffic signal studies for new signal installations and optimization retiming studies for existing signal systems, sign studies, volume studies, traffic impact studies, accident reduction studies and requests for information and advice on design criteria, installation techniques, and maintenance practices relative to traffic engineering applications.

A new Engineering Technician II position was approved in October and filled in late November. Because of this and other changes in personnel, considerable time has been devoted to training new personnel.

ACCIDENT STUDIES

Activities and Accomplishments

The Accident Studies Function primarily seeks to identify hazardous locations in North Carolina and select those locations which have the greatest potential for accident reductions. This Function also maintains and updates the railroad grade crossing inventory and location maps. This data together with railroad crossing accident data is used to develop a priority listing of crossings eligible for improvements under the several Federal Highway Safety Acts.

The Accident Studies Function attained the following accomplishments during 1984:

- ... Completed and published the 1984 Accident Investigation Program. This program contains 528 urban and rural locations ranked in priority order based on a combination rating of exposure, number of accidents, and accident severity. This list includes 441 intersections, 50 concentrations and sections, and 37 pedestrian locations.
- ... Completed 1088 routine and special requests for accident data. Of these requests, 203 were for collision diagrams, 87 were for "Before and After" studies and 798 were for other traffic accident studies.
- ... Continued to update and correct errors in the original American Association of Railroads - Federal Highway Administration Grade Crossing Inventory and maintained the Railroad-Highway Grade Crossing Location maps.
- ... One member of the Function served as an instructor in a workshop sponsored by the Institute of Transportation Engineers.
- ... Completed analyzing relations in accidents for twin-trailer trucks and mobile homes.

FIELD SUPPORT AND ACCIDENT STUDIES UNIT

ACTIVITY DESCRIPTION	1980		1981		1982		1983		1984	
	JAN.	JULY	JAN.	JULY	JAN.	JULY	JAN.	JULY	JAN.	JULY
	-JUNE	-DEC.	-JUNE	-DEC.	-JUNE	-DEC.	-JUNE	-DEC.	-JUNE	-DEC.
	(TOTAL)		(TOTAL)		(TOTAL)		(TOTAL)		(TOTAL)	
1. Requests Logged In	402	359	342	320	259	437	237	357	295	331
	(	761)	(	662)	(	696)	(	594)	(	626)
12. Accident Data Requested	494	400	442	399	293	308	187	371	209	176
	(	894)	(	841)	(	601)	(	558)	(	385)
13. Traffic Volumes Requested	235	208	250	236	283	351	162	298	270	261
	(	443)	(	486)	(	534)	(	460)	(	531)
14. Work Orders Processed	68	102	80	141	60	160	49	68	97	90
	(	170)	(	221)	(	220)	(	107)	(	187)
15. Municipal Speed Zone Additions	84	55	69	71	100	105	112	73	78	149
	(	139)	(	140)	(	205)	(	185)	(	227)
16. Municipal Speed Zone Deletions	54	41	60	40	43	61	67	121	172	131
	(	95)	(	100)	(	104)	(	188)	(	303)
17. Rural Speed Zone Additions	408	445	262	384	292	500	361	444	346	509
	(	853)	(	646)	(	792)	(	805)	(	855)
18. Rural Speed Zone Deletions	208	217	152	168	152	184	129	214	152	368
	(	425)	(	320)	(	336)	(	343)	(	520)
19. No Parking Ord. Additions	87	182	95	111	72	75	72	83	75	85
	(	269)	(	206)	(	147)	(	155)	(	160)
110. No Parking Ord. Deletions	2	242	28	28	33	18	19	22	15	19
	(	244)	(	56)	(	51)	(	41)	(	34)
111. Stop Sign Ord. Additions	771	1579	548	436	683	211	445	381	351	302
	(	2350)	(	984)	(	894)	(	826)	(	653)
112. Yield Sign Ord. Additions	61	149	85	226	69	33	85	33	65	30
	(	210)	(	311)	(	102)	(	118)	(	95)
113. Yield Sign Ord. Deletions	3	3	3	4	5	4	1	7	3	11
	(	6)	(	7)	(	9)	(	8)	(	14)
114. US Route Changes-Additions & Deletions	1	0	17	6	12	0	15	46	15	14
	(	1)	(	23)	(	12)	(	61)	(	29)

FIELD SUPPORT AND ACCIDENT STUDIES UNIT

ACTIVITY DESCRIPTION	1980		1981		1982		1983		1984	
	JAN.	JULY	JAN.	JULY	JAN.	JULY	JAN.	JULY	JAN.	JULY
	-JUNE	-DEC.	-JUNE	-DEC.	-JUNE	-DEC.	-JUNE	-DEC.	-JUNE	-DEC.
	(TOTAL)		(TOTAL)		(TOTAL)		(TOTAL)		(TOTAL)	
15. NC Route Changes Additions & Deletions	4	3	23	13	22	20	22	7	6	13
	(	7)	(	36)	(	42)	(	29)	(	19)
16. NC-US Route Changes Additions & Deletions	1	0	19	10	10	0	--	--	2	2
	(	1)	(	29)	(	10)	(	--)	(	4)
17. Temporary Speed Zone Ordinance Additions & Deletions	6	4	2	3	6	3	2	3	12	6
	(	10)	(	5)	(	9)	(	5)	(	18)
18. One-Way Road or Street Ordinance-Additions	1	0	2	2	1	0	4	3	1	1
	(	1)	(	4)	(	1)	(	7)	(	2)
19. Truck Route Ordinance-Additions	10	2	1	33	8	7	4	45	5	6
	(	12)	(	34)	(	15)	(	49)	(	11)
20. Right Turn On Red Ordinance-Additions	14	49	58	12	9	13	8	15	8	5
	(	63)	(	70)	(	22)	(	23)	(	13)
21. Right Turn On Red Ordinance-Deletions	11	198	52	2	9	0	4	9	2	1
	(	209)	(	54)	(	9)	(	13)	(	3)
22. Stop Sign Deletions	64	137	129	281	117	35	71	203	76	214
	(	201)	(	410)	(	252)	(	274)	(	290)
23. Truck Information Station					0	2	--	--	--	--
	(	--)	(	--)	(	2)	(--)	(--)
24. No Fishing From Hwy. R/W - Deletions And Additions.	--	--	--	--	--	--	--	--	0	1
	(	--)	(	--)	(	--)	(	--)	(	1)
25. Project Plans Reviewed										
	(	90)	(	31)	(	25)	(	--)	(	178)
26. Regular Driveway Permit Reviews										
	(	15)	(	22)	(	21)	(	37)	(	25)
27. Special Driveway Permit Reviews										
	(	132)	(	122)	(	121)	(	130)	(	161)
28. Equivalent Accidents Plotted	21633	21248	22603	14110	13282	10997	15522	11214	9977	8493
	(	42881)	(	36713)	(	24279)	(	26736)	(	18470)

FIELD SUPPORT AND ACCIDENT STUDIES UNIT

ACTIVITY DESCRIPTION	1980		1981		1982		1983		1984	
	JAN. -JUNE	JULY -DEC.	JAN. -JUNE	JULY -DEC.	JAN. -JUNE	JULY -DEC.	JAN. -JUNE	JULY -DEC.	JAN. -JUNE	JULY -DEC.
	(TOTAL)		(TOTAL)		(TOTAL)		(TOTAL)		(TOTAL)	
29.Collision Diagrams Prepared	247	150	142	144	140	74	133	128	75	128
	(	397)	(	286)	(	214)	(	261)	(	203)
30 Before and After Studies Prepared	195	169	304	44	23	0	30	137	37	40
	(	364)	(	398)	(	23)	(	167)	(	87)
31.Rates Calculated for Tentative Safety Program Listing	107	451	337	172	179	481	810	0	765	0
	(	558)	(	509)	(	860)	(	810)	(	765)
32.Other Accident Studies Prepared	492	423	362	412	412	406	416	524	454	344
	(	915)	(	774)	(	818)	(	940)	(	798)
33.Production Rates; Accidents Plotted Per Man Day Worked	20.2	21.6	22.0	18.0	26.1	30.4	25.6	23.7	20	27
	(	20.9)	(	20.3)	(	27.9)	(	24.6)	(	23)
	()	()	()	()	()
	()	()	()	()	()
	()	()	()	()	()
	()	()	()	()	()
	()	()	()	()	()
	()	()	()	()	()
	()	()	()	()	()
	()	()	()	()	()

AREA TRAFFIC ENGINEERING UNITS

Purpose:

The Area Traffic Engineering Units are responsible for the investigation and implementation of improvements on the Safety Program, the investigation and processing of requests and complaints regarding traffic matters on State System Highways, and the carrying out of policies and procedures of the Division of Highways. They also provide traffic engineering services on a statewide basis through the administration of three Area Traffic Engineering offices, coordinating with the 14 Division Traffic Engineers. More specifically, the responsibilities of the Traffic Engineers within these areas are:

- To investigate identified accident locations and provide recommended treatment to eliminate safety hazards.
- To formulate safety improvement projects for possible future funding through any future Highway Safety Programs (i.e. Federally-funded type safety programs, etc.).
- To investigate fatal traffic accident sites to determine if immediate safety improvement measures are required.
- To provide accident data quickly to Division personnel when requested.
- To investigate and report to the Accident Studies Unit for analysis information regarding traffic accidents involving roadway safety design features (i.e. breakaway sign supports and guardrail terminal sections, crash attenuators, etc.).
- To provide information upon request regarding FHSA improvement locations, N.C. DOT's Safety Program, etc.

Personnel:

There are three Area Traffic Engineering Units. Each unit is headed by an Area Traffic Engineer with an office located strategically within his area. Each Area Traffic Engineer has a staff of one or more Traffic Engineers. A total of ten Highway Engineers are located throughout the State to carry out the field operations of the Traffic Engineering Branch. The Traffic Engineers are based either in the Area office or in offices located within the Area. Each Area Traffic Engineer is responsible for the Branch's field operations in approximately one-third of the State.

Organization Changes:

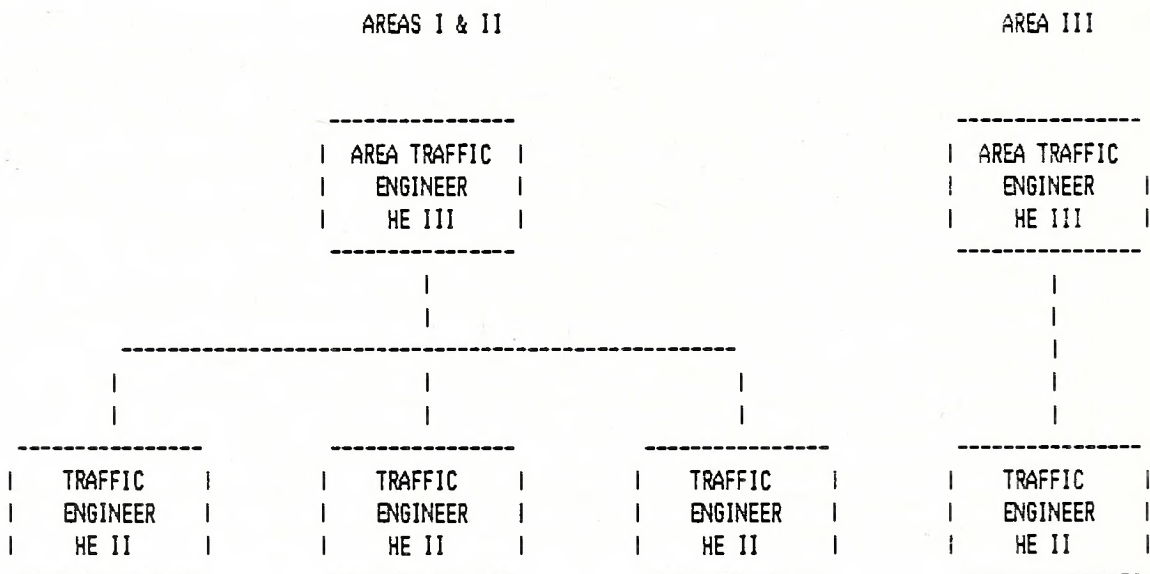
None.

These three Areas are assigned the 14 Divisions in the following manner:

AREA 1 consists of Divisions 1-5 and the main office is located in Wilson with an engineering office located in Durham.

AREA 2 consists of Divisions 6-10 and the main office is located in Winston-Salem with an engineering office located in Fayetteville.

AREA 3 consists of Divisions 11-14 and the main office is located in Asheville.



ORGANIZATION CHART

AREA TRAFFIC ENGINEERING UNITS

AREA TRAFFIC ENGINEERING UNITS

ACTIVITY DESCRIPTION	AREA I		AREA II		AREA III	
	JAN.	JULY	JAN.	JULY	JAN.	JULY
	-JUNE	-DEC.	-JUNE	-DEC.	-JUNE	-DEC.
	(TOTAL)		(TOTAL)		(TOTAL)	
1. Urban Speed Zones	112	98	49	55	25	22
	(210)		(104)		(47)	
12. Rural Speed Zones	116	107	113	82	129	165
	(223)		(195)		(294)	
13. School Investigations (Cross-walks, Speed Zones etc.)	13	15	18	16	10	8
	(28)		(34)		(18)	
14. Intersection Studies	79	67	49	68	32	46
	(156)		(117)		(78)	
15. Regulatory Sign Investigations	45	45	39	37	26	32
	(90)		(76)		(58)	
16. Guide Sign Investigations	42	29	54	66	25	23
	(71)		(120)		(48)	
17. Warning Signing Investigations	39	33	26	19	22	20
	(72)		(45)		(42)	
18. Plan Reviews	62	55	50	66	12	11
	(117)		(116)		(23)	
19. Crossover Investigations	23	26	9	23	3	7
	(49)		(32)		(10)	
110.Route Changes	6	7	9	5	4	6
	(13)		(14)		(10)	
111.Hazardous Location Investigations-Non-Safety Program	34	29	22	46	0	0
	(63)		(58)		(0)	
112.Special Commercial Driveway Permit Reviews	39	68	36	57	20	22
	(107)		(93)		(42)	
113.Rural Safety Program Investigations	22	11	16	10	20	15
	(33)		(26)		(35)	
114.Urban Safety Program Inventory	50	41	35	49	6	27
	(91)		(84)		(33)	

AREA TRAFFIC ENGINEERING UNITS

ACTIVITY DESCRIPTION	AREA I		AREA II		AREA III	
	JAN.	JULY	JAN.	JULY	JAN.	JULY
	-JUNE	-DEC.	-JUNE	-DEC.	-JUNE	-DEC.
	(TOTAL)		(TOTAL)		(TOTAL)	
15.RR Crossing Studies	29	18	43	95	8	10
	(47)		(138)		(18)	
16.Encroachment Contracts	3	5	1	0	0	0
	(8)		(1)		(0)	
17.Traffic Signal Investigations	62	45	133	120	37	36
	(107)		(253)		(73)	
18.Pavement Marking Investigations	14	13	13	20	18	24
	(27)		(33)		(42)	
19.Other Field Investigations	28	31	95	84	27	22
	(56)		(179)		(49)	
20.Fatal Accident Location Studies	179	201	179	246	43	45
	(380)		(425)		(88)	
21.Pavement Marking Studies	2	4	0	0	0	0
	(6)		(0)		(0)	
22.Channelization	9	3	0	0	0	0
	(12)		(0)		(0)	
23.Breakaway Signs, Guardrail, Accidents, etc.	2	3	0	0	0	0
	(5)		(0)		(0)	
24.Curve Delineation Studies	7	8	0	0	0	0
	(15)		(0)		(0)	
25.Sandpile Hit Investigations	--	--	--	--	0	0
	(--)		(--)		(0)	
26.Truck Route & Spot Speed Studies	4	7	0	0	0	0
	(11)		(0)		(0)	
27.Social Events (Foot, Bike, Boat Races, etc.)	5	5	0	0	0	0
	(10)		(0)		(0)	
	()		()		()	

DIVISION TRAFFIC SERVICES UNITS

Purpose:

The purpose of the Division Traffic Services Units is to install and maintain traffic control devices including signs, signals, and pavement markings throughout the state on State System Streets and Highways.

Personnel:

The Division Traffic Services Units are directly staffed to their respective Division Engineer. They are normally composed of: a Division Traffic Engineer, a Traffic Services Supervisor, 8 Sign Erection Crews, 2 Traffic Control Technicians, 1 Traffic Control Technician Supervisor, and 3 Pavement Marking Crews totaling approximately 35 men.

Activities and Accomplishments:

During the past year, the Division Traffic Services Units installed and maintained the traffic control devices on State roads. These traffic control devices are divided into three categories: signs, signals, and markings.

Signs: Each Division normally has 8 sign erection crews, under the direction of a Traffic Services Supervisor. These crews are responsible for erecting and maintaining signs along the State maintained highways in the Division.

Signals: The approximately 5000 traffic signals on State maintained highways are the responsibility of the Traffic Control Technicians in each Division. After receiving the plans for a signal installation prepared by the Traffic Engineering Branch, these technicians, with the help of others in the Traffic Services Unit, install the signals. This installation includes the erection of poles and spanwire, as well as the electrical control equipment involved with the signal, which includes lamp replacement of damaged heads or damaged wiring. It is not uncommon to see Division Traffic Services personnel out repairing a damaged signal at any hour of the day or night.

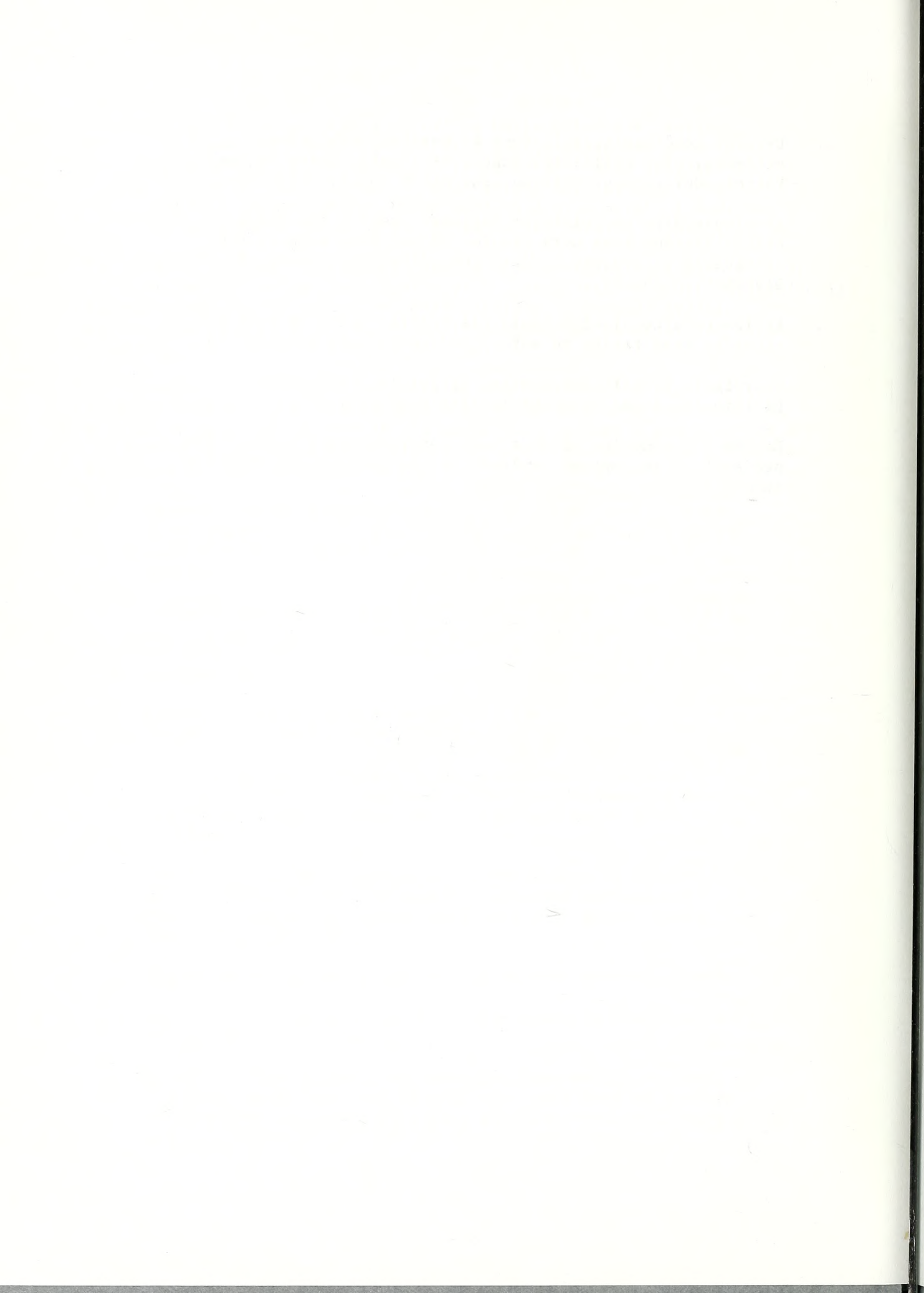
Markings: The Division Traffic Services Units paint the center-lines and edgelines on nearly 55,000 miles of paved roadways in the state. This is a year-round job, though most of the painting is done in the spring, summer and fall months. These Units applied approximately 1,000,000 gallons of paint on State System Roadways in 1984.

The Traffic Services Units work closely with the Traffic Engineering Branch and provide assistance (technical advice, manpower, and equipment) which is indispensable to the effective implementation of various traffic engineering related programs which are planned and administered by the Branch.

The Division Traffic Engineer oversees the functions of his Traffic Services Unit and also has responsibility for inventory and budgeting procedures required to provide the materials, equipment and supplies that are needed for the Unit's activities. The following traffic engineering functions are performed by the Division Traffic Engineer:

- ... Investigate all complaints and requests for traffic operations improvements, and provide the Division Engineer with technical assistance in answering these complaints and requests.
- ... Evaluate all engineering data necessary to arrive at engineering decisions. This data may include traffic counts, accident studies, delay studies, parking studies, speed studies, etc.
- ... Prepare plans for and supervise the installation of minor traffic engineering improvements.
- ... Make preliminary design sketches and submit recommendations through the Division Engineer to Traffic Engineering Branch for final design preparation to alleviate major traffic problems.
- ... Coordinate and/or supervise the installation of traffic control devices, such as signing, pavement marking and traffic signals, to assure compliance with plans, specifications, and policies.
- ... Supervise the proper timing of all traffic control signals.
- ... Assist the District Engineer in the technical review of all regular driveway permits.
- ... As the Traffic Engineering representative of the Division Engineer, work very closely with City officials on traffic related City problems, providing as much technical advice and assistance as possible.

- ... Develop good public relations in dealing with private citizens, city officials, school officials, State Highway Patrol, DOT representatives, and other public officials
- ... As directed by the Division Engineer, review and check channelization fund work orders and see that work is proceeding in an orderly manner. Coordinate this work with District Engineers.
- ... Review on a continuing basis all traffic engineering functions as they relate to safety and conformity to policies.
- ... Coordinate traffic engineering activities through the Division Engineer with the Traffic Engineering Branch.
- ... Review construction project plans and provide estimates for needed traffic control devices, as directed by the Division Engineer.



PROFESSIONAL ACTIVITIES

By encouraging its personnel to participate in professional activities and to work toward professional and educational advancement, the Traffic Engineering Branch hopes to cultivate individual professionalism and thereby fully develop the potential of the organization.

Among the professional organizations to which Traffic Engineering Branch personnel belonged in 1984, the Institute of Traffic Engineers claimed the greatest number: 14 in the national organization, 17 in the Southern Section, and 27 in the North Carolina Division.

On page 59 is a membership roster of Traffic Engineering personnel who are members of the Institute of Traffic Engineers and/or other professional organizations.

There are 19 registered Professional Engineers within the Branch and one Certified Engineering Technician. These employees are listed on page 58.

During 1984, Traffic Engineering Branch personnel served on the following committees and/or offices in dealing with traffic engineering subjects:

1. Traffic Engineering Management Board (Alternate)
2. ITE Workshop Instructor
3. SSITE Nominating Committee
4. NCSSITE -Technical Training
-Secretary/Treasurer
5. PENC Professional Registration Committee

In addition, Traffic Engineering Branch Personnel participated in the following regional and national technical meetings and conferences of a professional nature:

- ITE Annual Meeting
- SSITE Annual Meeting
- NCSSITE Annual Meeting
- PENC Annual Meeting
- Public Transportation Forum
- N. C. Land Use Congress
- 3-M Sheeting Demonstration
- Variable Message Matrix Sign Demonstration

In order to maintain or improve their professional standing and effectiveness in the field of traffic engineering, Traffic Engineering Branch personnel participated in the following training activities, courses, and workshops:

- DOT Training Program (12-week program)
- Annual Traffic Services Supervisors Meeting
- ITE Apple Workshop
- ITE DUI Workshop
- Microcomputers in Transportation Workshop
- FHWA Workshop on Traffic Control Devices Handbook
- Terrain Analysis Course
- Technical Drafting 101
- Engineering Statics 214
- SAS Short Course
- Quality Circle Seminar
- Construction and Maintenance Signing Seminar

REGISTERED PROFESSIONAL ENGINEERS

Bivens, N. R.
Blount, E. B.
Crowe, N. C., Jr.
Deaver, P.G.
Dodge, R. J.
Eason, G. A.
Edmonds, R. E.
Gettier, G. L.
Grigg, G. G., Jr.
Kimley, R. J.
Lynch, J. M.
Mallard, E. F.
Milam, K. E.
Payne, B. G.
Permar, J. F.
Robertson, D. W.
Sessoms, C. C., Jr.
Ward, W. A.
Watson, W. J.

CERTIFIED ENGINEERING TECHNICIANS

Kellenberger, J. W.

PROFESSIONAL ORGANIZATION MEMBERSHIPS
OF
TRAFFIC ENGINEERING PERSONNEL

NAME	ITE	SSITE	NCDSSITE	NSPE	PENC	NCSE	REC	ASCE	CCCASCE	ASCET
N.R. Bivens, P.E.			AF							
E.B. Blount, P.E.	F	M	M	M	M	M	M			
G.S. Boyles	A		M					M		
W.M. Braswell			AF							
N.C. Crowe, Jr., P.E.	M	M	M	M	M					
R.J. Dodge, P.E.	F	M	M				M			
G.A. Eason, P.E.	M	M	M							
L.M. Eddins			AF							
R.E. Edmonds, P.E.	A	M	M							
G.L. Gettier, P.E.			AF	M	M					
C.B. Goode, Jr.			AF							
T. Jeffreys			AF							
H.A. Justice		M	M							
J.W. Kellenberger										M
R.J. Kimley, P.E.	L	M	M	M	M	M	M	F	M	
J.M. Lynch, P.E.	F	M	M	M	M			M	M	
M.W. Oldham			AF							
B.G. Payne, P.E.	M	M	M	M	M					
T.A. Peoples			AF							
D.W. Robertson, P.E.	A	M	M	M	M			M	M	
J.F. Rosendahl	M	M	M							
H.L. Satterwhite, Jr.			AF							
C.C. Sessoms, Jr., P.E.		PAF	AF	M	M					
J.W. Shaw			AF							
J.L. Stamp		PAF	AF							
W.A. Ward, P.E.		PAF	AF							
W.J. Watson, P.E.	M	M	M					M		
D.W. Webb	A	M	M							
L.T. Williams	A	M	M							

Abbreviations for the above organizations and membership grades:

PE - Registered Professional Engineer

ITE - Institute of Transportation Engineers

SSITE - Southern Section Institute of Transportation Engineers

NCDSSITE - North Carolina Division of the Southern Section of
Institute of Transportation Engineers

NSPE - National Society of Professional Engineers

PENC - Professional Engineers of North Carolina

NCSE - North Carolina Society of Engineers

REC - Raleigh Engineers Club

ASCE - American Society of Civil Engineers

CCCASCE - Central Carolina Chapter of the American Society of Civil
Engineers

ASCET - American Society of Certified Engineering Technicians

L - Life

M - Member

A - Affiliate

F - Fellow

A - Associate Member

PAF - Professional
Affiliate

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